

PA 697104

USSR/Soil Science  
Clay  
X-Ray Analysis

Apr 1946

"Roentgenographic and Thermographic Characteristics  
of Montmorillonite Clays," N. I. Gorbunov, I. G.  
Iayurup, Ye. A. Shurygina, 8 pp

"Rezhovod" No 4

This is one of widest distributed mineral clays.  
Tests conducted to clarify genesis and structure of  
montmorillonite clays. However, it was first neces-  
sary to determine similarities and differences of  
subject clays to other clays in various deposits.  
X-ray studies made to determine curves showing

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effect of heating on subject clays. X-ray studies  
also made of colloidal soils and comparisons were  
made of two series of X-ray data.

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GORBUNOV, N. I.

CA

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The mineralogical characteristics of the silt fraction of the illuvial horizon of several chestnut brown solonchaks soils of the region of the second Don terrace. A. Ya. Shevchenko and N. I. Goryunov. *Pochvovedenie* (Pedology) 1940, 465-73. The 0.001-mm. fraction obtained by dispersion was analyzed by x-ray and thermal methods. The differential thermal curves for a series of soils are given. Among the minerals found are: beidellite, mica, hydrous mica, quartz, and several amorphous substances. The greater the solonchak properties of the soil, the more beidellite is found. The content of this mineral fluctuates from 18 to 40%. There is more of this mineral in the illuvial than in the plowed layer.

J. S. Joffe

*cA*

The minimum amount of crystalline substances sufficient for x-ray determination in mixtures with amorphous materials. N. L. Gortunov and I. G. Tsyurupa. Doklady Akad. Nauk S.S.S.R. 65, 51-4(1949); cf. C.A. 42, 3043b. — Mixts. of amorphous matter (hydrated Fe oxide, humic acid, silicic acid) and common cryst. minerals (montmorillonite, kaolinite, quartz, gypsum, and muscovite) were examd. with a 40-kv. x-ray tube (Fe radiation) and 30-hr. exposures. The min. detectable amt. of the latter depends on the material, ranging from quartz to montmorillonite (worst). Fe hydrate gives the densest background; humic and silicic acids, faint. Min. amt. of quartz: 2% with humic acid, 8% with Fe hydrate; kaolinite: 2 and 20%, resp.; montmorillonite: 5 and 25%, resp.

G. M. Kosolapov

CA

15

Thermographic determination of minerals in soil fraction of soils without combustion of the organic substances. N. I. Gorbunov and E. A. Shurygina. *Doklady Akad. Nauk S.S.S.R.* 67, 1007-1100 (1949).--The heating curves of soil samples can be obtained without preliminary combustion of org. matter, provided that the thermocouples used are enclosed in protective sleeves; the loss of sensitivity is not very serious as it can be counteracted by using more sensitive galvanometers and by reduction of total circuit resistance. Occasionally, the heat of combustion of the org. matter may raise the curve above reference level. A no. of typical curves are shown.  
G. M. Kisilapull

CA

15

Mineralogical characteristics of silt fractions obtained from soils and clays. N. I. Gorbunov, I. G. Tsyurupa, and E. A. Shurygina. *Doklady Akad. S.S.S.R.* 68, 149-51 (1949).—Treatment of soil or clay sample with dil. mineral acids, followed by water washing, neutralization by KOH or NaOH, shaking, and boiling yields a smaller amt. of particles below 0.001 mm. diam. than obtainable by 15-20 min. repeated kneading in the form of thick "dough" with H<sub>2</sub>O, but a single kneading gives reverse results. In all cases the small particles are very similar and are predominantly hydrophobes: mica, hydro-mica, kaolinite, etc. The minerals of montmorillonite group are higher in the small particle fraction after 2nd kneading than after the 5th or 6th kneading.  
G. M. Kowolapoff

GORBUNOV, N. I.

26979. GORBUNOV, N. I., SHURYGINA, E. A. Termografichyeskoe opredeleniye mineralov v  
ilistoy fraktsii pochv bez szhiganiya organicheskikh veshchestv. Doklady akad.  
Nauk. SSSR, Novaya seriya, T. LXIII, No. 6, 1949, s 1097-100.

So: Letopis' Zhurnal'nykh Statey, Vol. 36, 1949.

Thermal curves of minerals encountered in soils and rocks. N. I. Gorbunov and E. A. Shurygina (X-ray-  
Electronographic Lab., Soil Inst., Acad. Sci. U.S.S.R.).  
*Pochvovedenie (Pedology)* 1950, 307-73. — The differential  
thermal curves of the following minerals are given: albite,  
quartz, muscovite, hydrous mica, kaolinite, halloysite,  
ferrihalloysite, nontronite, beidellite (yellow, white,  
gray-green), montmorillonite (askanite, askan-clay, ben-  
tonite), pyrophyllite, talc, monotherrite, hematite, hy-  
drohematite, hydrogoethite, limonite, hydrated iron oxide,  
diaspore, boehmite, gibbsite, hydrated oxide of Al, calcite,  
aragonite, gypsum, chlorite, hornblende, amorphous-  
silica, and humic acid. Besides, there are thermal curves  
of mixts. of sand and  $Al_2O_3$  (80 and 20, 70 and 30, 50 and  
50, 40 and 60, 20 and 80, 10 and 90, and 5 and 95% of  
sand  $Al_2O_3$ , resp.), of mixts. of askanite and muscovite,  
and of mixts. of kaolinite and muscovite. The individual  
curves are discussed. J. S. Joffe

C.A.

15

Optimal conditions for x-ray studies of particle sizes / separated from soils and clays. N. I. Gorbunov and I. G. Tsyurupa. *Doklady Akad. Nauk U.S.S.R.* 77, 717-20 (1951).—Expts. with fractions of various particle size for x-ray and thermal methods of mineral analyses show that particles  $<1 \mu$  are most suited. For special purposes this fraction was divided into two:  $1-0.2 \mu$  and  $<0.2 \mu$ . The finer fraction can be used for x-ray and electronic methods of analyses. The thermal analysis method of this fraction is not practical since it requires 2.5 g. of the material. Data are presented showing that in the montmorillonitic clays (askaniya, humbria, bentonite) the quantity of the fraction  $<0.2 \mu$  is not higher than 53%. In kaolinitic clays this particle-size fraction is 8.5%. The  $<1 \mu$  fraction in montmorillonitic clays is 96% and in kaolinitic clays and some clay soils up to 65%. It is thus desirable to analyze this fraction. However, even the fraction  $>1 \mu$  contains some clay minerals. The trouble with this fraction is that in the x-ray photograph the clay mineral lines are obscured by the large quantity of quartz and primary minerals. The relative proportions of the clay minerals in this fraction are low, 2-3%. It is suggested that the coarser fractions should be analyzed by optical methods. A table of data gives the proportion of the different particle-size fractions as deciphered by x-ray analyses on clays and some zonal soils. J. S. Joffe



GOEBUNOV, N.I.; TSYURUPA, I.G.; SHURYGINA, Ye.A.; TYURIN, I.V., otvetstvennyy redaktor; GORBUNOV, N.I., professor, otvetstvennyy redaktor; MARKOV, V.Ya., redaktor; ZELENKOVA, Ye.V., tekhnicheskiy redaktor

[X rays, thermograms and dehydration curves of minerals found in soils and clays] Rentgenogrammy, termogrammy i krivye obesvoshivaniia mineralov, vstrechaiushchikhsia v pochvakh i glinakh. Moskva, Izd-vo Akademii nauk SSSR, 1952. 185 p. [Microfilm] (MLRA 7:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Tyurin)  
(Minerals in soil)

1. CORBUNOV, N. I.
2. USSR (600)
4. Soils-Analysis
7. Minerals of the fine fraction of soil, governing factors in their determination and methods of research. Pochvovedenie. No. 10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified

FORBUNOV, N.I.; KOVALEV, R.V.

Physicochemical indexes on the suitability of soils for tea culture.  
Pochvovedenie '53, No.2, 70-80. (MLRA 6:3)  
(CA 47 no.21:11619 '53)

GORBUNOV, N.I.

SEDLITSKIY, Ye.A.

Unsuccessful textboo ("Roentgenograms, thermograms, and curves of the dehydration of minerals found in soils and clays." N.I. Gorbunov, I.G.Tsiurupa, E.A.Shurygina. Reviewed by I.D.Sedletskii). Zap.Vses.min.ob-va 83 no.1:70-75 '54. (MLRA 7:3)

1. Rostovskiy gosudarstvennyy universitet im. V.M.Molotova.  
(Mineralogy, Determinative) (Gorbunov, N.I.) (Tsiurupa, I.G.)  
(Shurygina, E.A.)

GORBUNOV, N. I.

Soil incrustation on cotton field irrigation. Moskva, Akad. nauk SSSR, 1955. 45 p.  
(Nauchnopol'liarnaia seriia)

Gorbunov, N.I.

AGV Questionable and erroneous recommendations in x-ray  
analyses of clay minerals. N. I. Gorbunov. *Pochrovedenie*  
1955, No. 7, 66-8.—A crit. analysis of the recent work con-  
ducted in Russia on the interpretation of x-ray data in ana-  
lyzing clay minerals. J. S. Joffe

GORBUNOV, N. I.

Clay minerals of chernozem, chestnut brown, and solonchaks soils. N. I. Gorbunov (V. V. Dokuchaev Inst. Soil Sci., Acad. Sci. U.S.S.R., Moscow). *Pochvedenie* 1955, No. 11, 26-35. Data are presented on the < 0.001-mm. fraction of the following clay minerals (several samples from different zones): montmorillonite and its related beidellite; phengite and kaolinite group, including allophane; muscovite and pyrophyllite. The analyses include: pH (H<sub>2</sub>O) and neutral salt (NaCl), exchange capacity of this fraction, as well as of the entire clay separate, and hygroscopicity, max. and min. moisture. For 10 analyses are given on the < 0.001-mm. fraction of 8 profile samples of chernozem, of various parent material origin, and of a red soil on diorite. The analyses cover hygroscopicity, max. and min. moisture,  $\text{SiO}_2$ ,  $\text{R}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{MnO}$ ,  $\text{CaO}$ ,  $\text{MgO}$ ,  $\text{K}_2\text{O}$ ,  $\text{Na}_2\text{O}$ ,  $\text{SO}_4$ , and  $\text{SiO}_2/\text{Al}_2\text{O}_3$  ratio. Homogenized are given on the < 0.001-mm. fractions of chernozem and chestnut-brown soils from several sources of secondary minerals (montmorillonite, beidellite, kaolinite, and others) and on the < 0.001 of the 8 profile samples and the other soils on which total analyses have been made. I. S. Inde.

CORBUNOV, N. I.

"Clay Minerals of the Main Soil Types in the USSR," a paper presented at the 6th International Soil Science Congress, Paris, 28 Aug-8 Sep 56.

Library Branch #5



GORBUNOV, N. I., KELLEMAN, V. V., and ANTIPOV-KARATAYEV, I. N.

"ON the Colloid Chemical Nature of Soil Aggregates" (O kolloidno-khimicheskoy prirode pochvennykh agregatov) from the book Trudy of the Third All-Union Conference on Colloid Chemistry, pp. 171-181, Iz. AN USSR, Moscow, 1956

(Reprot given at above Conference, Minsk, 21-4 Dec 53)

Authors: Soil Insitute AS USSR, Moscow.

*Gorbunov, N.I.*

USSR/Soil Science - Physical and Chemical Properties of Soils.

J-3

Abs Jour : Ref Zhur - Biol., No 3, 1958, 10492

Author : Gorbunov, N.I., Labenets, Ye.M., Sharina, N.A.

Inst :

Title :

The Mineralogical and Chemical Composition of the Muddy Fraction of the Takyry and of the Kizyl-Arvat Mountain Plain (An Extension of the Takyry)

Orig Pub : Takyry Zap. Turkmenii i puti ikh s.-kh. osvoyeniya, Moskva, Akad Nauk SSSR, 1956, 388-410

Abstract : Mud forms 16% of the upper part of the takyr crust and 32% of the lower part. Hydrophobic minerals (hydromicas) predominate in this fraction in the upper part of the crust, and hydrophilic minerals (beydellite and others) in the lower part. Data are given on radiosopic analysis, thermal analysis, and total analysis of the fine-grained fractions. The metabolic capacity is insignificant, as is the swelling and also the maximum hygroscopic moistness of the

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substances.

Card 2/2

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 1,  
p 74 (USSR) 15-57-1-466

AUTHOR: Gorbunov, N. I.

TITLE: The Systematic Pattern of Formation and Distribution  
of Clay Minerals in Soils (Zakonomernosti obrazovaniya  
i rasprostraneniya glinistyykh mineralov v pochvakh)

PERIODICAL: Vopr. mineralogii osadochn. obrazovaniy. Books 3-4,  
L'vov, L'vovsk. un-t, 1956, pp 564-574.

ABSTRACT: The mineral content of the fraction  $< 0.001$  mm has  
been studied for soils developed on acidic and basic  
rocks in different climatic zones. The author believes  
that the minerals of the montmorillonite and kaolinite  
groups are frequently found simultaneously in soils  
with different reactions. The quantity of kaolinite  
minerals increases under conditions of the more intense  
weathering of volcanic rocks. The principal factors  
in the weathering of rocks are the climate, the bio-  
chemical activity of plants, and time. The rate of

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15-57-1-486

The Systematic Pattern of Formation and Distribution (Cont.)

weathering also depends on the rock: basic rocks weather more easily than granites. Amorphous substances and minerals with sesquioxides form simultaneously with minerals of the montmorillonite and kaolinite groups. Gibbsite is especially abundant in krasnozems (red earths) and laterites on basic rocks. Hydromicas are most abundant in dry climates. Minerals of the kaolinite group are the dominant varieties when granites and basalts are intensively weathered. Under such conditions, feldspars alter to kaolinite, halloysite, and gibbsite. Highly dispersed quartz is found in all silty soils.

Card 2/2

G. A. G.

USSR/Soil Science. Tillage. Land Reclamation. Erosion.

J-5

Abs Jour: Ref Zhur-Biol., No 6, 1958, 24832.

Author : Gorbunov, N.I.; Labenets, E.M.

Inst :

Title : Soil Crust in Irrigation of Salt Flats and the Means of Combatting It.

Orig Pub: V. sb.: Takyry Zap. Turkmenii i puti ikh s.-kh. osvoyeniya. M., AN SSSR, 1956, 691-699.

Abstract: The basic method of combatting crust formation on salt flats is irrigation. Furrow and overhead irrigation is recommended. A positive effect of the thin testaceous crust that forms in overhead irrigation is observed; the crust prevents intensive evaporation of soil moisture. The formation of the salt flat crust decreases with mulching of the soil

Card : 1/2

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APPROVED FOR RELEASE: 06/13/2000 USSR/Soil Science. Tillage. Land Reclamation. Erosion. CIA-RDP86-00513R000516110018-8"

Abs Jour: Ref Zhur-Biol., No 6, 1958, 24832.

with straw, gumbrin [sic]. Sanding with batches smaller than 1000 tons per ha. is not effective.

Card : 2/2

GORBUNOV, N.I.

Regularities in the formation and distribution of clay minerals  
in soils. Vop.min.osad.obr. 3/4:564-574 '56. (MLRA 9:11)

1. Pochvennyy institut imeni V.V.Dokuchayeva, Moskva.  
(Clay)

*GORBUNOV NIKOLAY IL'ICH*

GORBUNOV, Nikolay Il'ich; ALESHIN, S.N., prof. otvetstvennyy red.; KORNEYEVA,  
K.I., red.izd-va; SUSHKOVA, L.A., tekhn.red.

[Soil colloids] Pochvennye kolloidy. Moskva, Izd-vo Akad.nauk SSSR,  
1957. 144 p. (MIRA 11:3)

(Colloids) (Soils)

GORBUNOV, N.I.; YARILOVA, Ye.A.

Physics and mineralogy of soils discussed at the Sixth Congress of Soil Scientists (International Society of Soil Science, First Commission). Pochvovedenie no.2: 105-108 F '57.

(MLRA 10:5)

1. Pochvennyy institut im. V.V. Dokuchayeva Akademii nauk SSSR.  
(Soil Physics)



GDR BUNOV, N.I.  
GORBUNOV, N.I.; POLYAKOV, Yu.A.

Methods applied in the German Democratic Republic for analysing  
soils and clay minerals. Pochvovedenie no.6:112-114 Je '57.  
(Germany, East--Soils--Analysis) (MLRA 10:9)  
(Minerals in soil)

GORBUNOV N.I.  
GORBUNOV, N.I.; POLYAKOV, Yu.A.

Exchange of experience between Russian and Polish soil scientists  
and agrochemists. Pochvovedenie no.6:118-119 Ja '57. (MLRA 10:9)  
(Soil research) (Agricultural chemistry)

Country : USSR  
 Category : Soil Science. Physical and Chemical Properties  
 of Soil.

53356

Abs. Jour. :  
 Author : Gorbunov, N.I.

Institut. :  
 Title : Electron Microscopic Study of Soil Colloids

Orig. Pub. : Pochvovedeniye, 1957, No. 8, 73-79

Abstract : The microrelief of primary minerals may be studied with the electron microscope by means of imprints or replicas. Replicas are the surface irregularities produced on collodion film when it is placed on an object having the most minute roughness. This method makes a study of the surface of primary minerals possible, even at the initial stage of erosion, when the dimensions of surface irregularities are a few millimicrons. Because the electron microscope makes it possible to determine the size

Card: 1/3

Country :  
Category :

J

53356

Abs. Jour. :

Author :  
Institut. :  
Title :

Orig. Pub. :

Abstract : of colloidal particles, their shape and relative positions, it has found wide application in diagnosing clayey minerals. The application of this method in combination with roentgenography and thermography holds out particularly promising prospects. Electron microscopic photographs are shown of colloids isolated from the soils, and of some highly dispersed minerals encountered in soils: kaolinite, halloysite, montmorillonite, hydromica. Photographs of organic substances and

Card: 2/3

Country :  
Category :

Abs. Jour. :

53356

Author :  
Institut. :  
Title :

Orig. Pub. :

Abstract : soil colloids are also presented. The regularity in occurrence of highly dispersed minerals in the principal soil types is examined. It is recommended that minerals which are not characteristic or are predominant in a given soil type be distinguished from minerals that are present but not characteristic of the particular soil type. --N.I. Gorbunov

Card: 3/3

GORBUNOV, N. I.

Achievements in investigating highly-dispersed soil minerals.  
Pochvovedenie no.10:33-50 0 '57 (MIRA 10:12)

1. Pochvennyy institut im.V.V.Dokuchayeva AN SSSR.  
(Soil colloids)

GORBUNOV, N.I.

Mineral and chemical composition of soil silt fractions, soil  
silt fractions, soil forming rocks and alluvial deposits in the  
Kura-Aras Lowland. Trudy pochv.inst. 53:3-38.'58. (MIRA 11:9)  
(Kura Lowland--Soils)

Country : USSR  
Category : Soil Science. Physical and Chemical Properties of Soils. J

Abs Jour : RZhBiol., No 6, 1959, 24582

Author : Gorbunov, N. I.  
Inst : Soil Institute AS USSR.  
Title : Mineralogical Composition and Properties of Suspended Matter in the Amu-Dar'ya and Kura Rivers.  
Orig Pub : Tr. Pochv. in-ta AN SSSR, 1958, 53, 51-53

Abstract : Suspended matter of the Kura River and its tributaries is richer in silt fractions (45.5-57.9 percent) than the suspended matter of the Amu-Dar'ya River. Study of the mineralogical composition of the suspended matter's silt fractions was conducted by thermal, rentgenographic methods and occasio-

Card : 1/4

Country : USSR  
Category : Soil Science. Physical and Chemical Properties of Soils. J  
APPROVED FOR RELEASE: 06/13/2000

Abs Jour : RZhBiol., No 6, 1959, No 24582

Author :  
Inst :  
Title :

Orig Pub :

Abstract : nally with the aid of an electronic microscope. Beydellite and hydromica were identified in the suspensions; beydellite predominates in the suspensions of the Kura River, and hydromica in Amu-Dar'ya. The exchange capacity of a fraction; less than 0.001 mm, from the Kura's suspended matter constituted more than

Card : 2/4

Country : USSR  
Category : Soil Science. Physical and Chemical Properties of Soils. J

Country : USSR  
Category : Soil Science. Physical and Chemical Properties of Soils. J

Abs Jour : RZhBiol., No 6, 1959, No 24582

Author :  
Inst :  
Title :

Orig Pub :

Abstract : vely. The differences of the mineralogical composition and physico-chemical and physical properties condition the different effect of irrigating waters on the properties of the soils. -- N. I. Basilevich

Card : 4/4



GORBUNOV, H.I.

Swelling of soils and clay minerals. Trudy vochv. inst. 53:  
64-74 '58. (MIRA 11:9)  
(Soil physics)

30(1)

SOV/30-59-2-24/60

AUTHOR:

Gorbunov, N. I., Doctor of Agricultural Sciences

TITLE:

News in Brief (Kratkiye soobsheniya) Congress of Soil Experts of the People's Republic of Poland (S"yezd pochvovedov Pol'skoy Narodnoy Respubliki)

PERIODICAL:

Vestnik Akademii nauk SSSR, 1959, Nr 2, pp 81-82 (USSR)

ABSTRACT:

The Congress took place in Kraków from September 9 until September 11, 1958 and had been convened by the

Association of Soil Experts at the Polish Academy of Sciences). Results of scientific work carried out by Polish experts in the field of agrochemistry, soil science and methods of soil investigation were discussed. The Soviet experts A. V. Sokolov, N. I. Gorbunov and Yu. A. Pol'yakov took also part. K. Baratyński, R. Shiller, A. Muzircwicz reported on the methods of chemical and physico-chemical soil analysis. M. Gorski, Academician of the Polish Academy of Sciences, reported on the use of radioactive and stable isotopes in connection with agrochemical soil investigations. The laboratory directors L. Chrobak, and Z. Tokarski reported on the application of methods of radiography, radiospectroscopy

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SOV/30-59-2-24/60

News in Brief. Congress of Soil Experts of the People's Republic of Poland

and thermography to the investigation of soil. T. Skowina and his collaborators spoke about conditions of the development of soils forming from waste matter of coal pits. Two agro-chemical laboratories carry out mass analyses of soils on the basis of which they make cartograms which are presented to the district authorities for the disposal of agronomists and farmers.

Card 2/2

GORBUNOV, N.I.; SOKOLOV, A.V.; POLYAKOV, Yu.A.

At the Conference of soil scientists of the Polish People's Republic.  
Pochvovedenie no.2:115-116 P '59. (MIRA 12:3)  
(Poland--Soil research)

SE PIN-ZHO [Hsieh P'ing-jo]; GORBUNOV, N.I.

Characteristics of the mineral composition of red soils developed  
on the eluvium of igneous rocks. Pochvovedenie no.9:22-28 S '59.  
(MIRA 13:1)

1. Pochvennyy institut im. V.V. Dokuchayeva Akademii nauk SSSR.  
(China--Soils, Red)

GORBUNOV, N.I., doktor sel'skokhozyaystvennykh nauk

Congress of soil scientists of the Polish People's Republic.  
Vest.AN SSSR 29 no.2:81-82 F '59. (MIRA 12:4)  
(Krakow--Soils--Congresses)

ORBUNOV, N.I.

Significance of minerals in soil fertility. Pochvovedenie no.7:1-13  
Jl '60. (MIRA 19:11)

1. Pochvennyy institut im V.V. Dokuchaeva AN SSSR.  
(Minerals in soil) (Soil fertility)

GORBUNOV, N. I. and SUN Da-chen

"Formation Of Clay Minerals In The First Stages Of Soil Formation".

~~xxxxxx~~ report submitted for the 7th Congress of International Society of Soil Science Madison, Wisconsin, 15-23 Aug 60.



GORBUNOV, N.I.

"Exchangeable adsorption in soil and the assimilation of  
nutrients by plants" by A.V.Peterburgskii. Reviewed by  
N.I.Gorbunov. Pochvovedenie no.8:113-115 Ag '60.

(MIRA 13:8)

(Minerals in soil) (Plants--Nutrition)

(Peterburgskii, A.V.)

GORBUNOV, N. I.

Methods of preparing soils, river suspensions and reservoir sediments for mineralogical analysis. Pochvovedenie no.11:79-84 N '60.  
(MIRA 13:11)

1. Pochvennyy institut im. V.V.Dokuchayeva Akademii nauk SSSR.  
(Soils--Analysis)

GORBUNOV, Nikolay I., Head, Soil Mineralogy Section, Soil Institute imeni V. V.  
Dokuchayev

"Use of the thermographic method for determination of highly dispersed  
minerals in soils"  
(Section IV)

report to be submitted for the Second Conference on Clay Mineralogy and Petrography,  
Prague, Czech., 10-17 May 1961.

GORBUNOV, N.I.; DZYADEVICH, G.S.; TUNIK, B.M.

Determining nonsilicate amorphous and crystalline sesquioxides in  
soils and clays. Pochvovedenie no.11:103-111 N '61. (MIRA 14:12)

1. Pochvennyy institut imeni V.V.Dokuchayeva.  
(Soils--Analysis) (Clay--Analysis)

GORBUNOV, N.I.

Preparation of clays, soils, and sediments of natural waters for  
X-ray analysis. Rent.min.syr. no.1:53-59 '62. (MIRA 16:3)

1. Pochvennyy institut AN SSSR.  
(X-ray crystallography)

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The author thanks O. J. Dayadovich, B. M. Tunik, and Y. G. Samunova for their great assistance in obtaining these data.

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THE

U. S. AIR FORCE

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CIA-RDP86-00513R000516110018-8"



SOKOLOV, A.V.; VLASYUK, P.A.; GRINCHENKO, A.M.; GORBUNOV, N.I.;  
DMITRIYENKO, R.A.; KONONOVA, M.M.; MISHUSTIN, Ye.N.

Immediate tasks in studying soil fertility and ways for its  
increase. Pochvovedenie no.1:8-20 Ja '63. (MIRA 16:2)  
(Soil fertility)

GORBUNOV, N.I.; GRADUSOV, B.P.; TRAVNIKOVA, L.S.

Formation and characteristics of vermiculites as related to  
their use in agriculture. Pochvov lenie no.11:1-10 N '64  
(MIRA 18:1)

1. Pochvennyy institut imeni V.V. Dokuchayeva, AN SSSR, Moskva.

GERASIMOV, I.P., akademik, glav. red.; RODE, A.A., red.; ANTIFOV-KARATAYEV, I.N., red.; KONONOVA, M.M., red.; MISHUSTIN, Ye.N., red.; GORBUNOV, N.I., red.; YEROKHINA, A.A., red.

[Physics, chemistry, biology and mineralogy of the soils of the U.S.S.R.; report at the Eighth International Congress of Soil Scientists] Fizika, khimiia, biologii i mineralogiia pochv SSSR; doklady k VIII Mezhdunarodnomu kongressu pochvovedov. Moskva, Nauka, 1964. 393 p.

(MIRA 17:9)

1. Vsesoyuznoye obshchestvo pochvovedov. 2. Prezident Vsesoyuznogo obshchestva pochvovedov (for Gerasimov). 3. Pochvennyy institut im. V.V. Dokuchayeva, Moskva (for Antipov-Karatayev, Gorbunov). 4. Institut mikrobiologii AN SSSR, Moskva (for Mishustin).

GORBUNOV, N.I.; YARIN, V.A. Vol. 14, No. 1, 1965.

Problems of soil mineralogy at the 8th International Congress of  
Soil Scientists. Pochvovedenie no. 5:101-106 My '65.

(MIRA 18:5)

ACC NR: AI7007595

SOURCE CODE: UR/0104/66/000/005/0095/0096

26

AUTHOR: Chuprakov, N. M.; Borovoy, A. A.; Postnikov, N. A.; Malychev, A. A.;  
Magidson, E. M.; Sin'chugov, F. I.; Zoyl'dzon, Ye. D.; Barchaninov, G. S.;  
Yermolenko, V. N.; Vasil'yev, A. A.; Sokolov, N. I.; Ul'yanov, A. S.;  
Fedoseyev, A. M.; Sarkisov, M. A.; Rokotyan, S. S.; Azar'yev, D. I.; Arzon,  
G. S.; Dubinskiy, L. A.; Zhulin, I. V.; Kolpakova, A. I.; Antoshin, N. N.  
Krikunchik, A. U.; Kuchkin, M. D.; Preobrazhenskij, N. Ye.; Rout, M. A.;  
Khcyfils, M. E.; Sharov, A. N.; Yakub, Yu. A.; Gorbunov, N. I.; Shurmukhin,  
V. A.; Beschinskiy, A. A.

ORG: none

TITLE: Boris Sergeyovich Uspenskiy (on his 60th birthday)

SCURCE: Elektricheskiye stantsii, no. 8, 1966, 95-96

TOPIC TAGS: hydroelectric power plant, electric engineering personnel.

SUB CODE: 10

ABSTRACT: B. S. Uspenskiy was born in June 1906. He graduated from  
the State Electric Machine Building Institute in 1928 as an electric  
installation engineer. He worked in the State Electro-Technical Trust  
for four years, then in the All-Union ElectroTechnical Union, where he  
planned power construction units. Plans which he made up at that time  
for the electrical portion of electrical stations and sub-stations are  
still being used. He was involved in planning and installation of the  
electrical portion of hydro-electric power stations and powerful pumping  
stations in the Moscow-Volga Canal. During the war, he was in charge in  
installation of the Krasnogorskaya Heat and Electric Power Station, the  
planning of the Urals Hydro-Electric Power Station and other projects. He

Cord 1/2

0928 1534

GORBUNOV, O.N.; RYADOV, V.G.; KLASSOVSKIY, Yu.A.

Toxic effect of radioactive iodine from a single oral administration.  
Med. rad. 5 no.6:69-74 '60. (MIRA 13:12)

(IODINE-ISOTOPES)

RYADOV, V.G.; GORBUNOV, O.N.

Determining urobilin in the urine by the fluorometric titration  
method. Lab. delo 7 no.9:34-35 S '61. (MIRA 14:10)  
(UROBILIN) (TITRATION)

GORBUNOV, O.N.

Change in the function of the thyroid gland during general  
irradiation with ultrasound, Uch. zap. Mosk. nauch.-issl.  
inst. san. i gig. no.11:91-96 '63. (MIRA 17:1)



ACCESSION NR: AP4031815

8/0240/64/000/004/0037/0042

AUTHOR: Gorshkov, S. I.; Gorbunov, O. N.; Nikol'skaya, R. M.

TITLE: Certain problems of the biological action of ultrasound related to its use in industry

SOURCE: Gigiyena i sanitariya, no. 4, 1964, 37-42

TOPIC TAGS: ultrasound, ultrasonics, ultrasound biological action, 80-140 db ultrasound, 54 and 28 kc ultrasound, conditioned reflex activity, bioelectric cortex activity, unconditioned reflex, bloodforming system, endocrine gland system, brain tissue respiration, total body ultrasound exposure, local ultrasound exposure

ABSTRACT: Experimental rats and rabbits were exposed to ultrasound from UZG-7a and UZG-7g sirens. To ensure uniform exposure of body surface to ultrasound, the animals were placed into a metal sphere with a diameter of 1 m. The intensity of ultrasound, controlled by the distance of the sphere from the siren and by special filters, ranged from 80 to 140 db at frequencies of 54 and 28 kc. Indices

Card 1/3

ACCESSION NR: AP4031815

were conditioned reflex activity, bioelectric cortex activity, unconditioned reflexes, thyroid gland function, morphological composition of peripheral blood, brain and liver tissue respiration, and blood alkalinity reserve. Results show that 95-100 db at 54 kc for 1-3 hrs is the liminal intensity for the nervous, endocrine, and bloodforming systems of experimental animals. This liminal intensity becomes supraliminal with daily exposure or increased single exposure to 4-5 hrs. An intensity of 125 db at 28 kc is liminal for the thyroid gland. Supraliminal ultrasound intensities produce two phase shifts in the organism. The first phase appears immediately after exposure and disappears by the end of the day. The second phase starts on the second day after exposure, and its duration depends on ultrasound intensity. With 135-140 db at 54 kc the second shift lasts for 3 weeks, but at 28 kc is poorly expressed. Though human and animal ears cannot perceive high-frequency sound vibrations, ultrasound produces physiological and biochemical shifts in their organisms. It appears that ultrasound acts on the entire body surface and does not depend on the ears as receptors as shown in experiments with antiphones. Ultrasound acting locally on the body produces a lesser effect than total exposure of the body. Under industrial conditions ultrasound

Card 2/3

ACCESSION NR: AP4031815

exposure should be regarded as largely local because the worker's clothing acts as an effective filter for the covered body surface. Orig. art. has: 3 figures.

ASSOCIATION: Moskovskiy nauchno-issledovatel'skiy institut gigiyeny\* im. F. F. Erismana (Moscow Scientific-Research Hygiene Institute)

SUBMITTED: 04Feb63

DATE ACQ: 11May64

ENCL: 00

SUB CODE: AM, IE

NO REF SOV: 006

OTHER: 003

Card 3/3

ACC NR: AM6011891

Monograph

UR

Gorshkov, Sergey Il'ich; Antropov, Gennadiy Andreyevich; Gorbunov, Oleg Nikolayevich  
Biological effect of ultrasound (Biologicheskoye deystviye ul'trazvuka) Moscow,  
Izd-vo "Meditsina", 1965. 196 p. illus., biblio. 3000 copies printed.

TOPIC TAGS: ultrasonics, ultrasonic biologic effect, industrial hygiene, industrial  
medicine, safety engineering

PURPOSE AND COVERAGE: The biological effects of ultrasound, particularly of low  
frequency, are considered for a variety of circumstances. The author attempts  
to systematize preexisting foreign and Soviet data, as well as his own investiga-  
tions, to indicate solutions to the important problems in this field. All types  
of exposure to ultrasound are considered, including therapeutic, industrial,  
and experimental exposures. Dosimetry is discussed, as is the need for establish-  
ment of definitive hygienic norms for exposure. The book should be useful to a wide  
variety of biologists, medical specialists (hygienists and therapists), scientific  
works, and safety engineers.

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UDC: 612.014.45+613.644

ACC NR: AM6011891

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ACC NR: AM6011891

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SUB CODE: 06/ SUBM DATE: 19Oct65/ ORIG REF: 114/ OTH REF: 126

Card 3/3

GORBUNOV, P.

"Themes for the school regional study group" by A.A.Svechnikov.

Reviewed by P.Gorbunov. Geog.v shkole 22 no.3:87-88

My-Je '59.

(MIRA 12:11)

(Moscow Province--Geography--Study and teaching)

(Svechnikov, A.A.)

GORBUNOV, P. (Yaroslavl')

Good friendship. Kryl. rod. 13 no.10:9 0 '62.  
(MIRA 15:10)

(Yaroslavl---Parachuting)



AUTHORS: Gorbunov, P.A.,  
Sazonov, A.S.

SOV/133-59-2-3/26

TITLE: Experience in Operation of a Covered Stock Yard for Ore  
Fines (Opyt raboty zakrytogo sklada rudnoy melochi)

PERIODICAL: Stal', 1959, Nr 2, pp 106-109 (USSR)

ABSTRACT: The practice adopted for the preparation of ore fines for  
sintering on No.1 MMK sinter plant in which a covered stock  
yard of 25,000 tons capacity is used for a preliminary  
averaging of the chemical composition of ore fines and  
concentrates is described and illustrated. It is shown that  
by a correct stock yard practice the range of variation in  
the chemical composition of ore fines can be reduced  
3-4 times. There are 2 tables and 7 figures.

ASSOCIATION: Magnitogorskiy Metallurgicheskiy Kombinat (Magnitogorsk  
Metallurgical Combine)

Card 1/1

~~GOBENOV, Petr Ivanovich; VAGINA, T.P., red.; KOVALENKO, V.L.,~~  
tekhn.red.

[Official documents] Delovye bumagi. Moskva, Gos.nachabno-  
pedagog.izd-vo M-va prosv.RSFSR, 1959. 49 p.

(Legal documents)

(MIRA 14:3)

GORELIK, B.M.; GORBUNOV, P.M.; BUKHINA, M.F.

Visual observation of crystalline formations in polychloroprene rubber.  
Vysokom.soed. 6 no.2:321-322 F. '64. (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.

Совбуков, П.П.

ANDREYEV, A.B.; ANTONOV, A.I.; ARAPOV, P.P.; BARMASH, A.I.; BEDNYAKOVA,  
A.B.; BENIN, G.S.; BERESNEVICH, V.V.; BERNSHTEYN, S.A.; BITUTSKOV,  
V.I.; BLYUMENBERG, V.V.; BONCH-BRUYEVICH, M.D.; BORMOTOV, A.D.;  
BULGAKOV, N.I.; VEKSLER, B.A.; GAVRILENKO, I.V.; GENDLER, Ye.S.,  
[deceased]; GHELIIVANOV, N.A., [deceased]; GIBSHMAN, Ye.Ye.;  
GOLDOVSKIY, Ye.M.; GOEBUNOV, P.P.; GORYALNOV, F.A.; GRINBERG, B.G.;  
GRYUNER, V.S.; DANOVSIIY, N.F.; DZEVUL'SKIY, V.M., [deceased];  
DREMAYLO, P.G.; DYBETS, S.G.; D'YACHENKO, P.P.; DYURMBAUM, N.S.,  
[deceased]; YEGORCHENKO, B.F. [deceased]; YEL'YASHKEVICH, S.A.;  
ZHERREBOV, L.P.; ZAVEL'SKIY, A.S.; ZAVEL'SKIY, F.S.; IVANOVSKIY,  
S.R.; ITKIN, I.M.; KAZHDAN, A.Ya.; KAZHINSKIY, B.B.; KAPLINSKIY, S.V.;  
KASATKIN, F.S.; KATSAUROV, I.M.; KITAYGORODSKIY, I.I.; KOLESNIKOV,  
I.F.; KOLOSOV, V.A.; KOMAROV, N.S.; KOTOV, B.I.; LINDE, V.V.;  
LEBEDEV, H.V.; LEVITSKIY, N.I.; LOKSHIN, Ya.Yu.; LUTTSAU, V.K.;  
MANNERBERGER, A.A.; MIKHAYLOV, V.A.; MIKHAYLOV, N.M.; MURAV'YEV, I.M.;  
NYDEL'MAN, G.B.; PAVLYSHKOV, L.S.; POLUYANOV, V.A.; POLYAKOV, Ye.S.;  
POPOV, V.V.; POPOV, N.I.; RAKHLIN, I.Ye., RZHEVSKIY, V.V.; ROZENBERG,  
G.V.; ROZENTRETER, B.A.; ROKOTYAN, Ye.S.; RUKAVISHNIKOV, V.I.;  
RUTOVSKIY, B.N. [deceased]; RYVKIN, P.M.; SMIRNOV, A.P.; STEPANOV, G.Yu,  
STEPANOV, Yu.A.; TARASOV, L.Ya.; TOKAREV, L.I.; USPASSKIY, P.P.;  
FEDOROV, A.V.; FERRE, N.R.; FRENKEL', N.Z.; KHEYFETS, S.Ya.; KHLOPIN,  
M.I.; KHODOT, V.V.; SHAMSHUR, V.I.; SHAPIRO, A.Ye.; SHATSOV, N.I.;  
SHISHKINA, N.N.; SHOR, B.R.; SHPICHENETSKIY, Ye.S.; SHPRINK, B.M.;  
SHTERLING, S.Z.; SHUTYY, L.R.; SHUKHAL'TER, L. Ya.; ERVAYS, A.V.;

(Continued on next card)

ANDREYEV, A.B. (continued) .... Card 2.

YAKOVLEV, A.V.; ANDREYEV, Ye.S., retsensent, redaktor; BERKEM-  
 GHYM, B.M., retsensent, redaktor; BERMAN, L.D., retsensent, redaktor;  
 BOLTINSKIY, V.N., retsensent, redaktor; BONCH-BRUYEVICH, V.L.,  
 retsensent, redaktor; VELLER, M.A., retsensent, redaktor; VINOGRADOV,  
 A.V., retsensent, redaktor; GUDTSOV, N.T., retsensent, redaktor;  
 DEGTYAREV, I.L., retsensent, redaktor; DEM'YANYUK, F.S., retsensent;  
 redaktor; DOBROSOMYSLOV, I.N., retsensent, redaktor; YELANCHIK, G.M.  
 retsensent, redaktor; ZHEMOCHKIN, D.N., retsensent, redaktor;  
 SHURAVCHENKO, A.N., retsensent, redaktor; ZLODEYEV, G.A., retsensent,  
 redaktor; KAPLUNOV, R.P., retsensent, redaktor; KUSAKOV, M.M.,  
 retsensent, redaktor; LEVINSON, L.Ye., [deceased] retsensent, redaktor;  
 MALOV, N.N., retsensent, redaktor; MARKUS, V.A. retsensent, redaktor;  
 METELITSYN, I.I., retsensent, redaktor; MIKHAYLOV, S.M., retsensent;  
 redaktor; OLIVETSKIY, B.A., retsensent, redaktor; PAVLOV, B.A.,  
 retsensent, redaktor; PANYUKOV, M.P., retsensent, redaktor; PLAKSIN,  
 I.N., retsensent, redaktor; RAKOV, K.A. retsensent, redaktor;  
 RZHAVINSKIY, V.V., retsensent, redaktor; RINBERG, A.M., retsensent;  
 redaktor; BOGOVIN, N. Ye., retsensent, redaktor; HUDENKO, K.G.,  
 retsensent, redaktor; RUTOVSKIY, B.N., [deceased] retsensent,  
 redaktor; HYZHOV, P.A., retsensent, redaktor; SANDOMIRSKIY, V.B.,  
 retsensent, redaktor; SKRAMTAYEV, B.G., retsensent, redaktor;  
 SOKOV, V.S., retsensent, redaktor; SOKOLOV, N.S., retsensent,  
 redaktor; SPIVAKOVSKIY, A.O., retsensent, redaktor; STRAMENTOV, A.Ye.,  
 retsensent, redaktor; STRELETSKIY, N.S., retsensent, redaktor;  
 (Continued on next card)

ANDREYEV, A.V., (continued) .... Card 3.

TRET'YAKOV, A.P., retsenzent, redaktor; FAYERMAN, Ye.M., retsenzent, redaktor; KHACHATYROV, T.S., retsenzent, redaktor; CHERNOV, H.V., retsenzent, redaktor; SHERGIN, A.P., retsenzent, redaktor; SHESTOPAL, V.M., retsenzent, redaktor; SHESHKO, Ye.F., retsenzent, redaktor; SHCHAPOV, N.M., retsenzent, redaktor; YAKOBSON, M.O., retsenzent, redaktor; STEPANOV, Yu.A., Professor, redaktor; DEM'YANYUK, F.S., professor, redaktor; ZNAMENSKIY, A.A., inzhener, redaktor; PLAKSIN, I.N., redaktor; RUTOVSKIY, B.N. [deceased] doktor khimicheskikh nauk, professor, redaktor; SHUKHGAL'TER, L. Ya, kandidat tekhnicheskikh nauk, dotsent, redaktor; BRESTINA, B.S., redaktor; ZNAMENSKIY, A.A., redaktor.

(Continued on next card)

ANDRYAN, A.V. (continued) .... Card 4.

[Concise polytechnical dictionary] Kratkii politekhnicheskii slovar'. Redaktsionnyi sovet; IU.A.Stepanov i dr. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1955. 1136 p. (MLRA 8:12)

1. Chlen-korrespondent AN SSSR (for Plaksin)  
(Technology--Dictionaries)

GORBUNOV, P. P.

Rigidity of tractor construction. Avt. trakt. prom. no. 2, 1952

Monthly List of Russian Acquisitions, Library of Congress, June 1952.



GORBUNOV, P. P.

Automobiles - Testing

Review of R. V. Kugel's "Driving axles in automobiles." (Methods of testing automobiles and their mechanisms, No. 3,) Avt. trakt. prom. No. 3, 1953.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

GORBUNOV, P. P.

"Investigating the Rigidity of the Transmission of Agricultural Tractors." Cand Tech Sci, Moscow Automotive Mechanics Inst, Moscow, 1954. (RZhMekh, Mar 55)

SO: Sum. No. 670, 29 Sep 55--Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (15)

GORBUNOV, P.P., kandidat tekhnicheskikh nauk.

Calculating rolling friction bearings for tractor and automobile transmissions. Avt. i trakt. prom. no.2:28-30 F '56.(MLRA 9:6)

1.Nauchno-issledovatel'skiy avtotraktornyy institut.  
(Roller bearings)

GORBUNOV, Pavel Petrovich; KUZNETSOV, Vladimir Filippovich; PLATONOV,  
S.A., red.; MEDNIKOVA, A.N., tekhn.red.

[Radio engineering and its applications] Radiotekhnika i ee  
primeneniye. Moskva, Voen.izd-vo M-va obor.SSSR, 1960. 375 p.  
(MIRA 13:12)

(Radio, Military)

Country : USSR  
 Category : Human and Animal Physiology. T  
 Blood. Blood Transfusions and Blood Substitutes  
 Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106331  
 Author : Gorbunov, P. T.  
 Institut. : Minsk Medical Institute.  
 Title : Deviations of Blood Cholinesterase Activity in  
 Test Animals Following Heterohemotransfusions.  
 Orig Pub. : So. nauchn. rabot Minskiy med. in-t, 18, 16-31  
 Abstract : The blood of rabbits (R) was subjected to 251  
 determinations of cholinesterase activity (CA)  
 before and after the rabbits has received blood  
 transfusions derived from guinea pigs, dogs,  
 and cats. Prior to being used, the blood was  
 stabilized by heparin. In 4 out of 5 experiments  
 CA was raised when the blood of guinea pigs was  
 introduced into the vein. The blood of dogs pro-  
 duced analogous effects. When injected into  
 veins or arteries, the blood of cats caused CA

1/4

Country : USSR  
 Category= : Human and Animal Physiology. T  
 Blood. Blood Transfusions and Blood Substitutes.  
 Abs. Jour. : Ref Zhur-Biol., No 23, 1956, 106351

Author :  
 Institut. :  
 Title :

Orig. Pub. :

Abstract :  
 (cont) to become lower. In most of the cases, small doses of blood (0.25 percent of R weight) did not produce CA changes. As the blood of cats with a different CA was introduced, the characteristics of CA changes were not affected in the blood of R. CA changes were most intensive 10 minutes after the transfusion. CA became normalized 24 hours after the transfusion. As the blood of dogs was transfused to R in the amount

Card: 2/4

Country : USSR  
 Category : Human and Animal Physiology.  
 Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106331

Author :  
 Institut. :  
 Title :

Orig Pub. :

Abstract (cont) : of 2 percent of R weight, the blood pressure mounted; 1-6 minutes later it began to fall, a shock developed, and the R died. As shock developed, CA increased on the average by 53.5 percent. As 2.5 percent of cat blood according to the weight of the test R were transfused, shock also resulted. In such cases, CA decreased by 51.5 percent. When dog blood was transfused, the number of Hb rose on the average by

Card: 3/4

Country : USSR  
 Category : Human and Animal Physiology  
 Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106331

Author :  
 Institut. :  
 Title :

Orig. Pub. :

Abstract (cont) : 8 percent, the number of E [erythrocytes] by 656,000 per 1 mm<sup>3</sup>, and the number of leucocytes showed a decrease of 1,160 per 1 mm<sup>3</sup>. As cat blood was transfused, the Hb numbers rose by 11 percent, E numbers increased by 746,000 per 1 mm<sup>3</sup>, and the leucocyte numbers decreased by 2,400 per 1 mm<sup>3</sup>. The subcutaneous introduction of heterogenic blood did not produce CA changes.  
 -- A. D. Beloborodova

Card: 4/4

GORBUNOV, P. T. Cand Med Sci --(diss) "Effect of heterotransfusion upon the activity of cholinesterase and the sensitivity of cholino- and adrenoactive structures (Experimental study)." Minsk, 1958. 18 pp (Minsk State Med Inst), 200 copies (KL, 14-58, 11c)



MARKEVICH, S.V.; KHARAMONENKO, S.S. [Kharamonenka, S.S.]; GOREBUNOV, P.T.  
(Harbunou, P. TS.); STAKHOVSKIY, Ye.V. [Stakhouski, IA.V.];  
VOLOKHANOVICH, A.I. [Valakhanovich, A.I.]; BONDARENKO, N.T.  
[Bandarenka, M.TS.]

Radiolysis of polyglukin solution. Vestsi AN BSSR Ser. biial.  
nav. no.3:107-113 '64 (MIRA 18:1)

GORBUNOV, P.V., inzh.; PAVLOV, K.V., [deceased], dotsent; PASHKOV, A.D., dotsent

Study of the use of perforators to drill long holes in stoping operations. Izv. vys. ucheb. zav.; gor. zhur. 6 no.4:19-24 '63. (MIRA 16:7)

1. Moskovskiy institut stali i splavov. Rekomendovana kafedroy burovzrybnogo dela i mekhanizatsii gornykh rabot. . . .  
(Rock drills--Testing)

GORBUNOV, Rem Grigor'yevich; VINOGRADOV, V.M., red.; KAKHOVSKAYA, O.G.,  
red. izd-va; LEKANOVA, I.S., tekhn. red.

[Soviet-American trade relations] Sovetsko-amerikanskije trgovye  
otnosheniia. Moskva, Vneshtorgizdat, 1961. 58 p. (MIRA 14:6)  
(Russia—Commerce—United States)  
(United States—Commerce—Russia)

188300

1413, 1416, 2808, 4016

26861  
S/080/61/034/004/002/012  
A057/A129

AUTHORS: Anitov, I.S., Gorbunov, S. A.

TITLE : Oxidation of titanium and its alloys in air at high temperatures

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 4, 1961, 725 - 734

TEXT: The oxidation behavior of commercial-grade titanium and binary titanium alloys with 5 % aluminum, tin, copper, silicon, iron, chromium, molybdenum or vanadium, and with 1.5 % and 10 % vanadium, respectively, were investigated at 700 - 1,000°C in untreated laboratory air. Some general considerations on the influence of these elements on titanium oxidation are presented. In spite of many investigations related to titanium oxidation, such as works by P. Kofstad et al. (Ref. 3: Acta Chem. Scand., 12, 239, 1958), O. Kubaschewskiy and B. Hopkins, V. I. Arkharov and G. P. Luchkin (Ref. 5: DAN SSSR, 83(6), 837, 1952, and W. Kinna and W. Knorr (Ref. 6: Z. Metallk., 47, 8, 594, 1956) few data are published concerning the influence of the alloy elements. Oxidation of titanium is rather complex, since it obeys in the range 300 - 600°C the cubic rate law, at 650 - 850°C the parabolic rate law, and above 800-850°C the linear rate law, ✓

Card 1/14

Oxidation rate of titanium .....

26861

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due to the effect of scale formation. Different data were also published on oxidation of titanium in oxygen and air atmosphere. A. D. Makkvillen and M. K. Makkvillen (Ref. 1: Titan (Titanium); Metallurgizdat, 1958) assume that the effect of alloy elements on scale formation should be considered on the basis of Wagner's diffusion theory.  $TiO_2$  formed on the surface during oxidation could be considered as semi-conductor with a deficiency in anions. Substitution of titanium ions in  $TiO_2$  by ions of metals with lower valency should cause an increase in electroconductivity and diffusion rate; an opposite effect should have metal ions with higher valency than titanium. Corresponding observations were made by K. Hauffe et al. (Ref. 9: Elektro-chem., 56, 937, 1952). The alloys investigated in the present work were prepared by double re-melting of a TiO (TiO) titanium sponge. The used titanium and alloys contained the following impurities: up to 0.20 % iron, 0.08 % silicon, 0.05 % carbon, 0.06 % chlorine, 0.03 % nitrogen, 0.15 % oxygen, 0.012 % hydrogen. Oxidation rate was studied at 700, 800, 900, and 1,000°C by the gravimetric method, at durations of the test of up to 45 hours. Oxidation of pure titanium in air occurs according to the parabolic rate law (Figure 1), just at the initial period the oxidation rate deviates from it (at 700°C in the first 3 hours oxidation occurs almost by the cubic rate law). The

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change to linearity at 900°C after 45 hours is explained by destruction of the scale. This occurs probably also at 1,000°C oxidation, but there (corresponding to observations by Ref. 3) impurities effect a quick sintering of scale. Results (Figures 2 - 5) on the effect of 5 % admixtures of alloy elements demonstrate that aluminum and silicon decrease the oxidation rate in the whole range of test temperatures. Iron, molybdenum, and vanadium increase the oxidation rate, the latter two especially at 1,000°C (Figure 5). While at 1,000°C oxidation of pure titanium the parabolic rate law was observed, 5 % vanadium admixtures effect a change to the linear rate law after 3 hours of oxidation and thus a strong increase in the oxidation rate. An analogous effect is observed with molybdenum admixtures at 1,000°C. Hence these admixtures apparently prevent sintering of scale at 1,000°C oxidation. According to Kubaschewski and Hopkins, as well as Leslie and Fontana, Cr/Ni alloys with high molybdenum content show a "catastrophic" oxidation. The latter is explained by the formation of volatile  $\text{MoO}_3$ . Among others, G. Ratheanan and J. Meijering (Ref. 11: Metallurgiya, 42, 167, 1950) agree with this hypothesis. Apparently in the present work the formation of low-melting, volatile  $\text{MoO}_3$  or  $\text{V}_2\text{O}_5$  (in vanadium alloys) effects the observed "catastrophic" oxidation of titanium at 1,000°C. Oxidation rate curves of other

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alloys for 1,000°C demonstrate that 5% copper alloys oxidize according to the cubic rate law, while for 5% iron and 5% tin alloys, this rate law is reached after 5 - 10 hours of oxidation. This somehow unexpected result can be explained by the influence of the nature of the oxides formed: Decrease of oxidation rate effected by aluminum and silicon, i.e., occurrence of the oxidation according to the cubic rate law with 5 % admixtures of these elements indicates that oxide films of these alloys yield a good protection from oxygen diffusion into the metal. Hence aluminum and silicon admixtures to titanium cause a shift of oxidation kinetics towards lower temperatures (200 - 300°C lower than for pure titanium), i.e., aluminum and silicon increase the heat resistance of titanium alloys. In Figure 2 and 3 it is shown that copper causes at 700°C and 800°C an increase, and at 900°C and 1,000°C (Figure 4,5) a decrease of oxidation rate compared to pure titanium. Tin has little or no effect on titanium oxidation. Summarizing it can be said: Aluminum and silicon decrease, while vanadium, iron and chromium increase the oxidation rate of titanium in the whole investigated temperature range. Copper effects an increase at lower and a decrease of oxidation rate at higher temperatures, while molybdenum shows the opposite effect. Tin has practically no effect on titanium oxidation. Above certain temperatures vanadium and molybdenum effect "catastrophic" oxidation of titanium. Thus, in first ap-

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proximation, it seems that the hypothesis made by Ref. 1 related to substitution of titanium ions is valuable. But a more detailed analysis of the present results demonstrates considerable deviations from this rule. The present authors consider that also other factors influence titanium oxidation. For instance, properties of the formed scale the effect of alloy elements on the formation of scale and the oxygen-saturated layer below the scale are affecting the titanium oxidation rate. These effects have to be investigated separately for each of the elements. In connection with "catastrophic" titanium oxidation alloys containing 1.5 % and 10 % vanadium, respectively, were investigated. The obtained results (Figures 6 - 9) demonstrate at 1000°C for 5 % and 10 % vanadium alloys, and at 800 and 900°C for 10 % vanadium alloys a linear oxidation rate law, otherwise a parabolic rate law. The change to the linear rate law (800°C for 10 % vanadium and 1,000°C for 5 % vanadium) alloy indicates the beginning of "catastrophic" oxidation. Increase in vanadium content increases the oxidation rate at all investigated temperatures. Thus with increasing vanadium content the temperature of "catastrophic" oxidation also decreases (from 1,000°C with 5 % V to 800°C with 10 % V). Catastrophic oxidation occurs when volatile vanadium pentoxide melts and evaporates in the scale (oxide film). At lower temperatures apparently a spinel structure is formed, and thus melting of  $V_2O_5$  is more difficult. The

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character of the form of vanadium-titanium alloy samples after oxidation at different temperatures is similar and indicates the prevailing diffusion of oxygen through the oxide film. The scale is formed principally in the phase interface metal-oxide. One of the factors effecting the destruction of the oxide film is the different molar volume of vanadium pentoxide and rutile. The present authors point out that in various technological operations the effect of vanadium on titanium oxidation must be considered. There are 11 figures and 11 references: 4 Soviet-bloc and 7 non-Soviet-bloc.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimicheskikh protsessov (All-Union Scientific Research Institute of Petrochemical Processes).

SUBMITTED: July 23, 1960

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GORBUNOV, S.A.; NADUTENKO, G.P.; TEODOROVICH, V.P.

Investigating the oxidation of VT-14, VT-8, VT-3 - 1 and the experimental alloy no.1 in the air at temperatures of 800-1200°. Titan 1  
ego splavy no.10:108-115 '63. (MIRA 17:1)

GORBUNOV, S.A.; ANITOV, I.S.; Primala uchastiye NADUTENKO, G.P.

Kinetics of oxidation in air of commercially pure titanium at  
high temperatures. Titan i ego splavy no.10:100-107 '63.  
(MIRA 17:1)

TIKHOMIROV, V.I., doktor khim. nauk; GORBUNOV, S.A., inzh.; FEDOROV,  
A.K., inzh.; BOGDANOV, V.N., inzh.

Character of nonmetallic inclusions during the butt welding  
of pipe heated by high-frequency currents. Svar. proizv.  
no.11:10-12 N'63. (MIRA 17:5)

1. Leningradskiy ordena Lenina gosudarstvennyy universitet  
imeni A.A. Zhdanova (for Tikhomirov, Gorbunov). 2. Nauchno-  
issledovatel'skiy institut tokov vysokoy chastoty im.  
V.P. Vologdina (for Fedorov, Bogdanov).

L 30370-66	EWI(m)/EWP(t)/ETI	IJP(c)	JD/IM/JG/WB/JXT(CZ)/GD
ACC NR: AT6012384	SOURCE CODE: UR/0000/65/000/000/0118/0154		
AUTHORS: <u>Nadutenko, G. P.</u> ; <u>Gorbunov, S. A.</u> ; <u>Anitov, I. S.</u> ; <u>Teodorovich, V. P.</u> 88			
ORG: none 86			
TITLE: A study of the effect of nickel, silicon, and niobium on the <u>oxidation</u> of titanium at high temperatures 88			
SOURCE: <u>Soveshchaniye po metallokhimii, metallovedeniyu i primeneniyu titana i yego splavov, 6th. Novyye issledovaniya titanovyykh splavov (New research on titanium alloys); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 148-154</u> BH			
TOPIC TAGS: titanium, titanium alloy, thermal stability, corrosion resistance, nickel, silicon, niobium, metal oxidation, binary alloy, oxidation kinetics			
ABSTRACT: The oxidation in air of binary titanium alloys is studied at a temperature range of 800--1200C. The alloys had 1.5, 5 and 10% nickel and silicon, and one had 25% niobium. The alloys were prepared by double melting of electrodes in an electric-arc vacuum furnace. The oxidation kinetics were studied by the method of periodic weighing. The specimens were heated in air for up to 16 hrs at 800--1000C and up to 8 hrs at 1100--1200C. It was found that 1.5% Si in the alloy was optimum for			
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L 30370-66

ACC NR: AT6012384

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increasing the thermal stability of titanium alloys at high temperatures; a further increase in the Si content decreases the oxidation resistance of the alloys. The introduction of Ni<sup>v</sup> considerably reduces the thermal stability as compared with unalloyed titanium. The introduction of 25% Nb ~~very~~ greatly increases the thermal stability of the alloy, particularly at 1100--1200. Orig. art. has: 4 figures and 1 table.

SUB CODE: 11/

SUBM DATE: 02Dec65/

ORIG REF: 010/

OTH REF: 001

Card 2/2 CC

ACCESSION NR: AT4007031

S/2598/63/000/010/0100/0107

AUTHOR: Gorbunov, S. A.; Anitov, I. S.

TITLE: Kinetics of oxidation of commercial grade titanium at high temperatures in air

SOURCE: AN SSSR. Institut metallurgii. Titan i yego splavy\*, no. 10, 1963. Issledovaniya titanovy\*kh splavov, 100-107

TOPIC TAGS: titanium oxidation, high temperature oxidation, scale structure, oxide layer structure, titanium oxidation kinetics, titanium oxidation mechanism

ABSTRACT: Oxidation of commercially pure titanium in heated laboratory (undried) air was studied at constant temperatures of 800-1200 C. The oxidation mechanism has been elicited by investigating the comparative O<sub>2</sub> distribution in the oxide layer and in the contaminated Ti zone situated beneath it, the thickness of the gas-contaminated surface, measured with a PMT-3 apparatus under 50 g load (no further details given), and the thickness and structure of the oxide scale after sintering (structural analysis by X-ray). The oxidation mechanism from 1100-1200 C differs from that at 800-1000 C principally in the higher diffusion rate of Ti atoms toward the surface. Further, at 1100-1200 C, O<sub>2</sub> distribution differs between the oxide scale layer and the air-contaminated layer. The oxidation rate measured up to 32

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hours, changes from linear (800, 900 C) to parabolic (1000 C) to cubic in nature (1100, 1200 C) with 4-hour experimental values at these five temperatures, of 10, 40, 220, 280 and 460 g/m<sup>2</sup>, respectively. The air contaminated Ti layer is characterized by a thin alpha-Ti shell of high hardness owing to high O<sub>2</sub> content, overlaid by up to several mm of beta-Ti of lesser hardness and an O<sub>2</sub> content of 0.15-2%. "G. P. Nadutenko also took part in the work." Orig. art. has: 3 tables and 5 graphs.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Dec64

ENCL: 00

SUB CODE: MM

NO REF SOV: 002

OTHER: 005

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ADDITIONAL INFORMATION

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L 8768-65

ACCESSION NR: A14007011